

Enhancing the impact of proving grounds with NWS training exercises on new weather satellites

A  Presentation

8th NOAA Testbeds and Proving Grounds Workshop, 25 April 2017

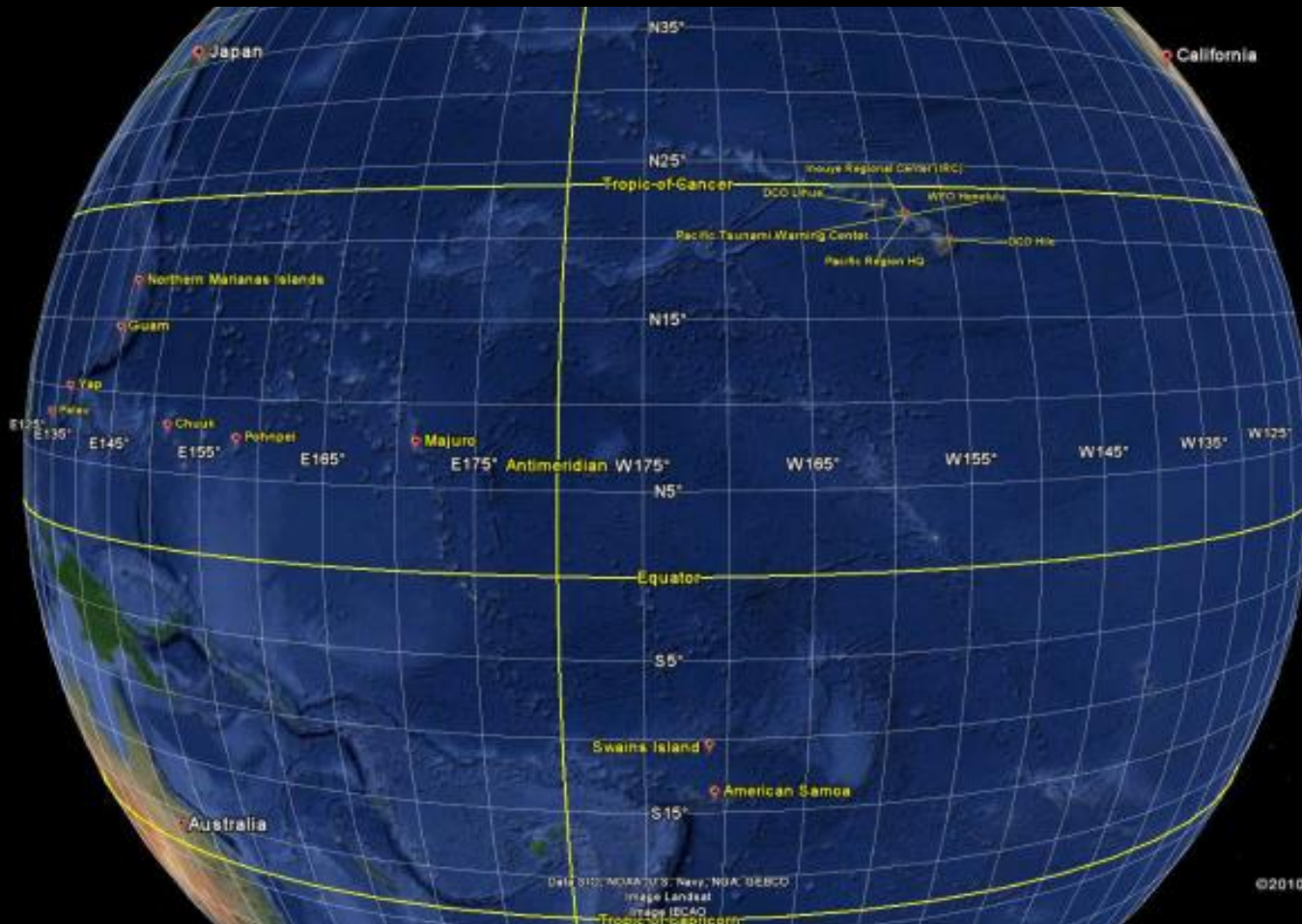
Jordan J. Gerth

Associate Researcher, Liaison to NWS Pacific Region
Cooperative Institute for Meteorological Satellite Studies
University of Wisconsin at Madison

Bill D. Ward

Environmental and Scientific Services Division Chief
National Weather Service Pacific Region Headquarters





©2016 Google

Credit: Eric Lau

Where America's Day Begins

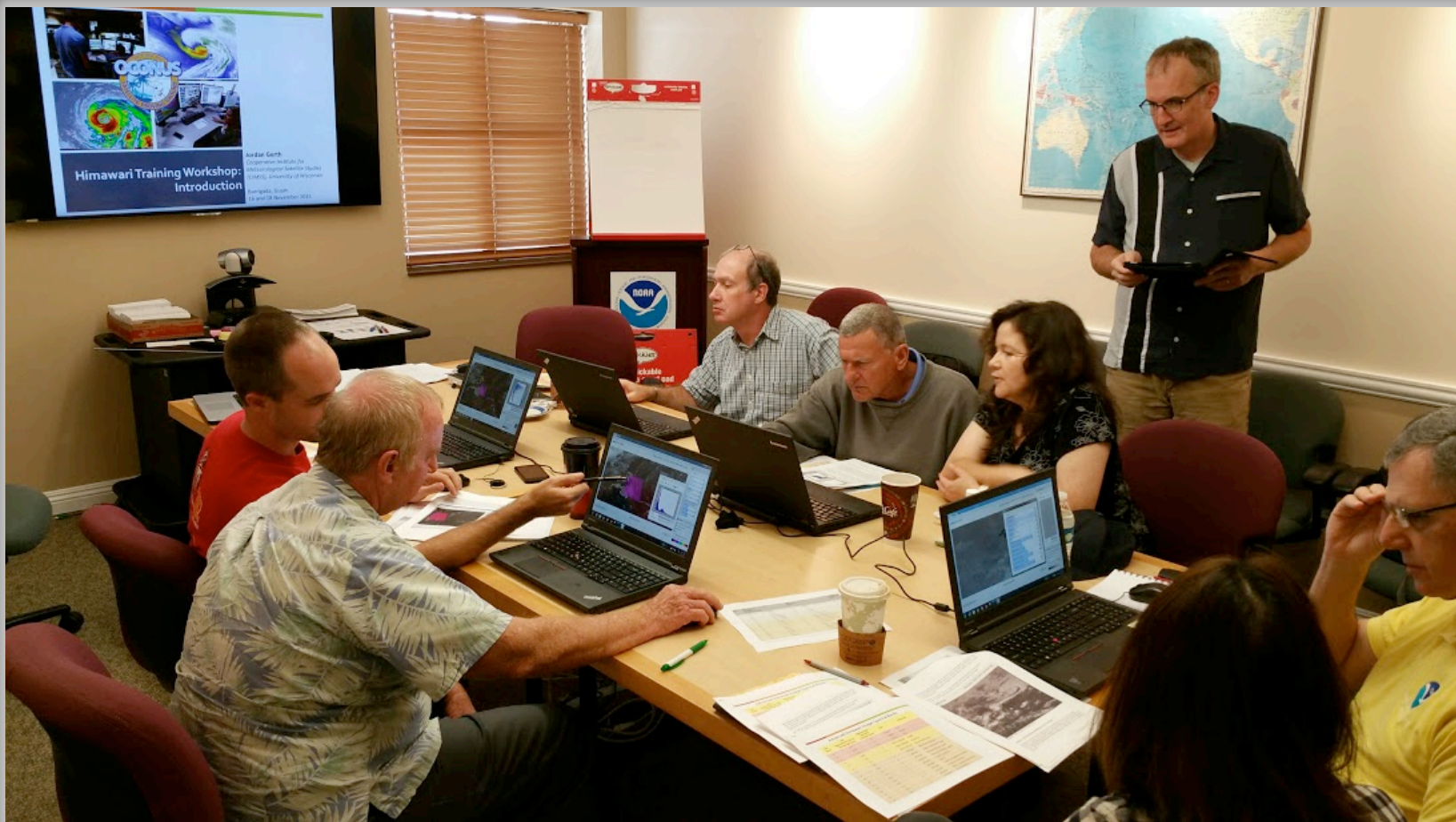
- NWS Guam's "day one" for the use of Japan's Himawari-8 imagery in operations was 4 December 2015.
- Instructor-led training was first offered to the staff at NWS Guam, then NWS Honolulu, and finally to many Science and Operations Officers (SOOs) to complement the material presented in the online foundational course.



NWS Pacific Region

- The meteorologists in NWS Pacific Region were the first to:
 - Receive formal training on new-generation weather satellites
 - Use Himawari-8 imagery operationally
 - Develop new color enhancements for Himawari-8 imagery
 - Find utility for Red-Green-Blue (RGB) composites





How can we build and maintain sufficient operational expertise without overburdening scientific expertise?



The Challenge

- Practically, we had to build **capacity**. In pursuing this, we focused on:
 - Ensuring technical systems were capable of delivering and displaying imagery and products at the full spatial, spectral, and temporal resolution
 - Infusing imagery and products into the operational forecast process with training
- We could have also:
 - Integrated new satellite data into predictive models



Principles for Accessible Data

- Science benefits from more data
- Data should be reasonably accessible
- Government scientific data should be free
- Data should be managed before collection begins
- Data should be compatible over common technical platforms
- Data should be available promptly
- Data policies should encourage collaboration



Value of Observations

Value =

Quality of Actionable Information (Statements) –
Amount of Factual Information (Data)

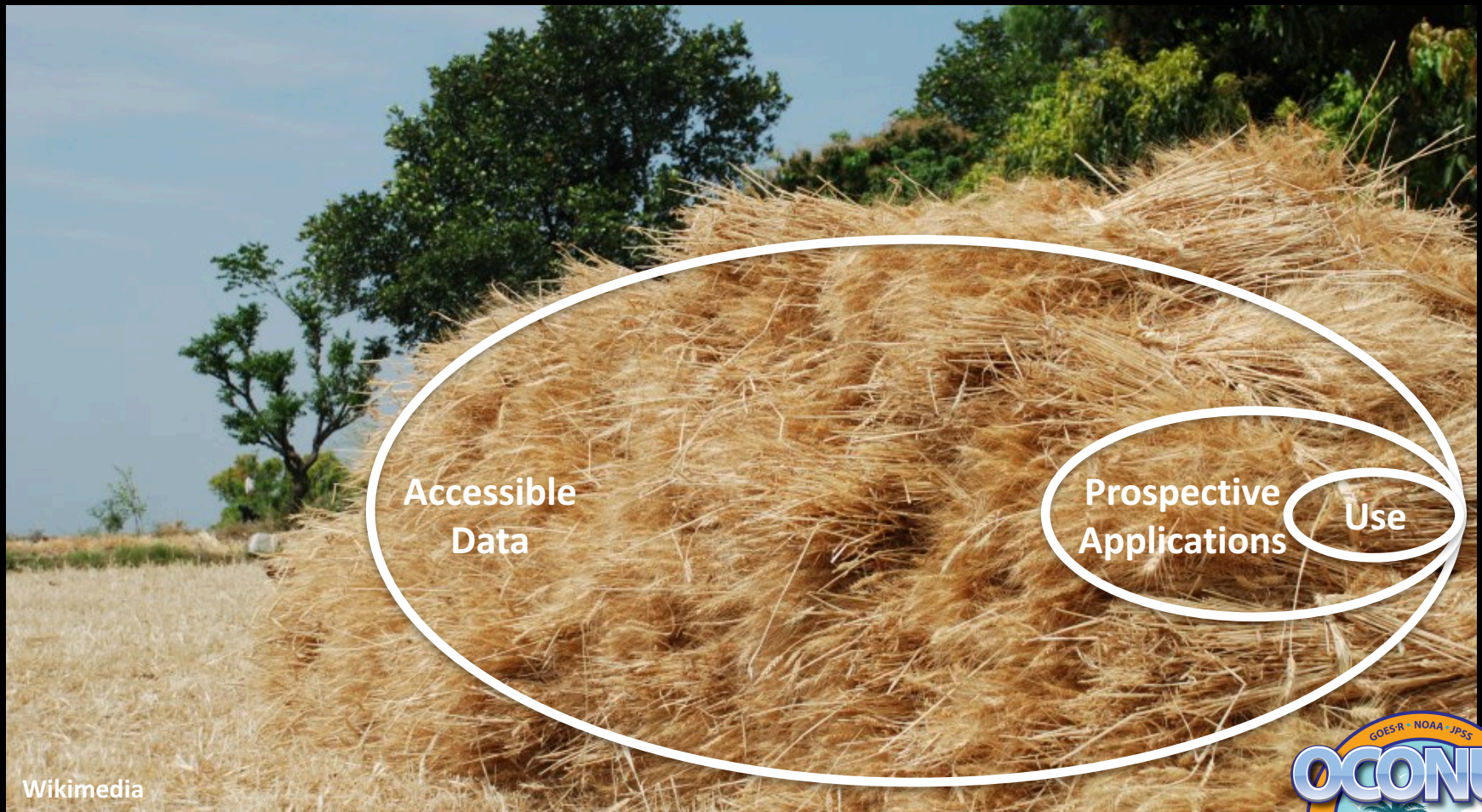


Value of Observations

- Value decreases when data increases without impacting a decision process.
- In this era of “big data”, the amount of data is endlessly increasing.
- Large geographic areas compound the operational challenges that “big data” cause.
- Modernizing weather forecast services hinges on the practitioner leveraging the right data at the right time.



Find the Needle in the Haystack



14-Dec-2016 12:00:00 UTC

IDL

Midway
Atoll

Gravity waves



30

165

170

25

IDL

-175

-175

0

-10

-20

-30

-40

-50

-60

-70

-80

-90 C



14-Dec-2016 12:00:00 UTC

IDL

Prospective
Applications

Prospective
Applications

Prospective
Applications

Use

Midway
Atoll

Gravity waves

Accessible
Data

IDL



“Big Data” Meteorology

- New environmental satellites
 - “Better, better, better”
- Improved numerical weather prediction capabilities
 - Resolution, skill, and ensembles
- Big Data = More Data
- More Data = More Science
- But what about better services?



Don't get caught in the "valley of death"

Big Data

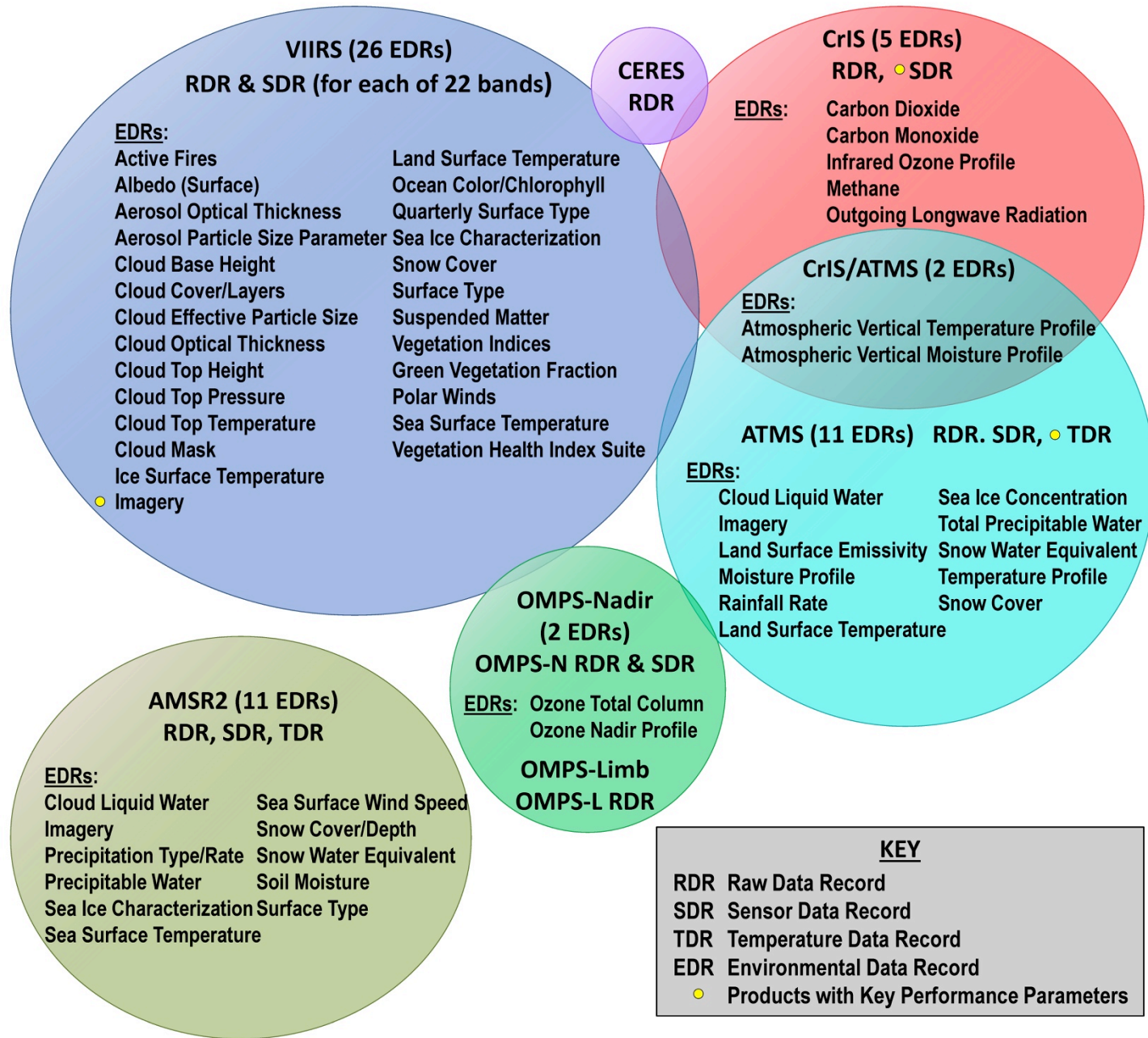
More Data

More Science

≠

Better
Services

JPSS Program Data Products



Two Types of “Big Data”

“Big data” sets can be characterized as either

- similar to existing data sets, but with better coverage or resolution, or from a new observing platform,
 - More voluminous
- or unlike anything seen or used before.
 - A new method of measuring/detecting a quantity or phenomena

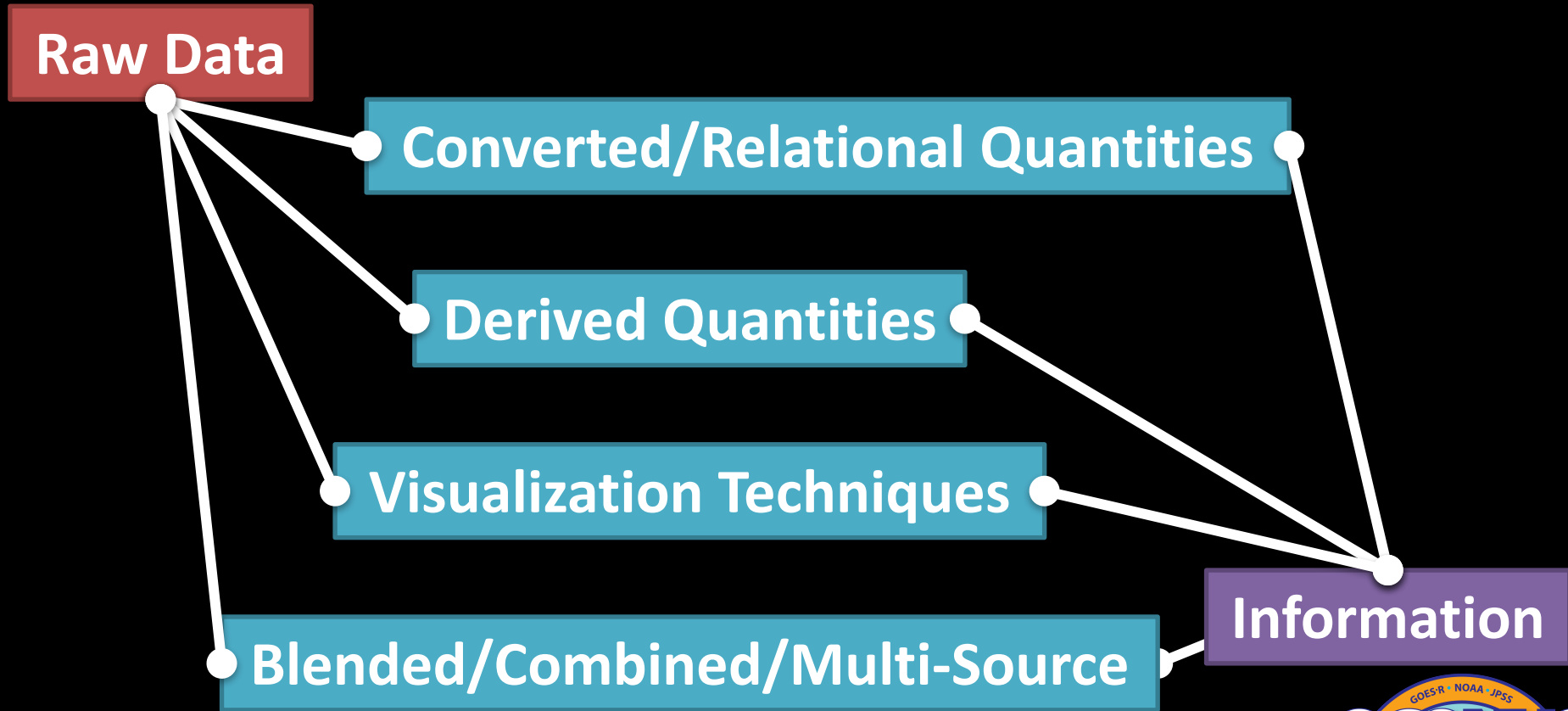


Constraints on “Big Data”

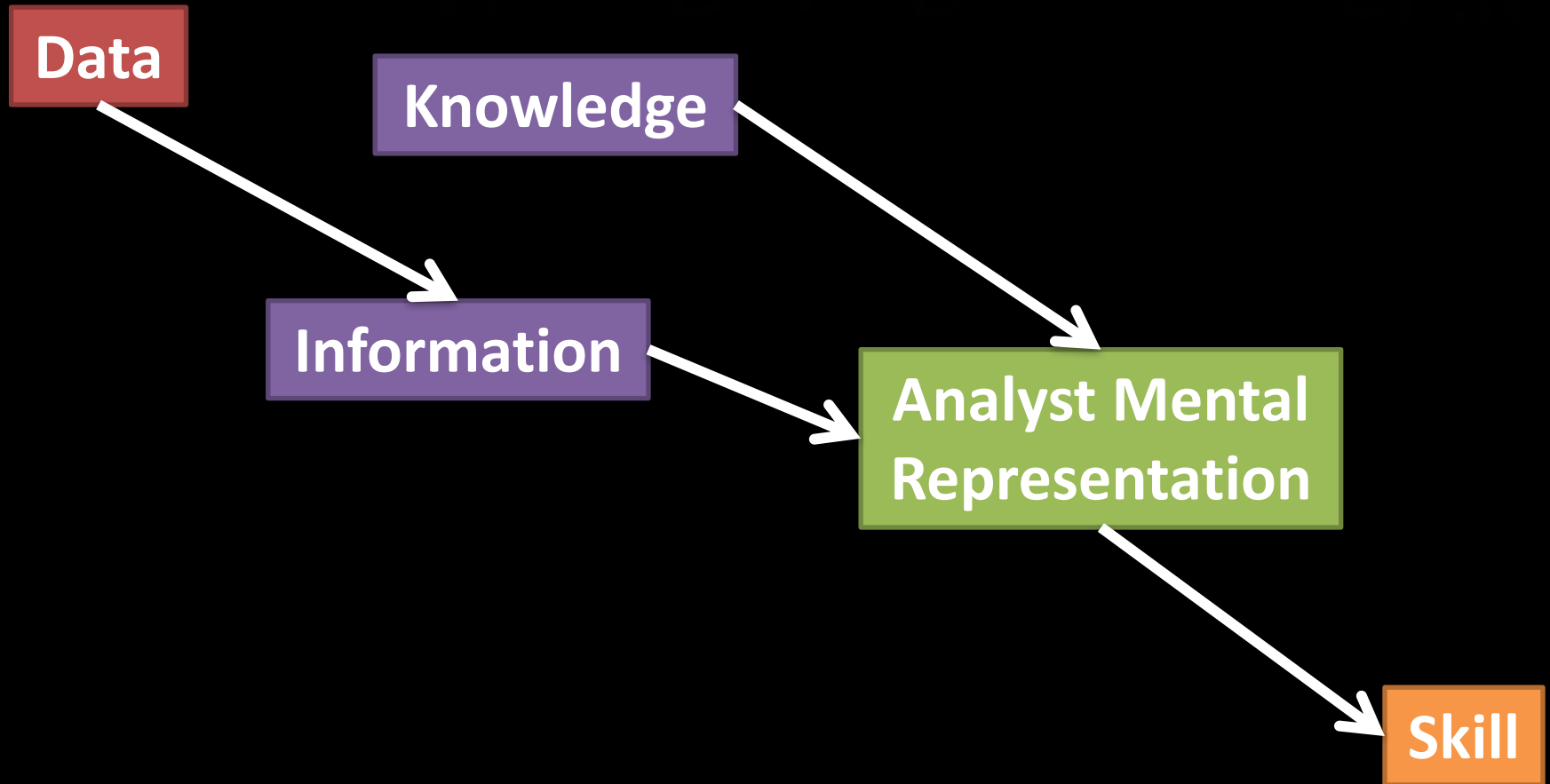
- Today’s operational meteorologist has the same amount of time to consider all available data!
- Technical systems and communications bandwidth must evolve to support access and timeliness requirements.
- Determining how to present new data to the analyst and formally assessing its relative value is challenging.



Data-Information Continuum



How Data Becomes Skill



In Practice

“Seeing Amos accelerating toward Samoa-up to 12-18 hours faster than current forecasts indicated. Viewing 10 minute Himawari clean and legacy IR bands really aided in center fixing and tracking. Was tracking overshooting tops in final RGB convective cloud product of day then meshed right into IR & lightning data to aid in confidence.”

Tom Birchard
Hurricane Specialist
Central Pacific Hurricane Center



Recommendations

- Operational software applications must be able to display new-generation satellite imagery seamlessly at the temporal frequency and duration that the user desires.
 - Test and innovate before and during the post-launch period
- Methods to reach users with training materials should be diverse and expansive.
 - Learning about the capabilities of new-generation satellites will not occur in one sitting



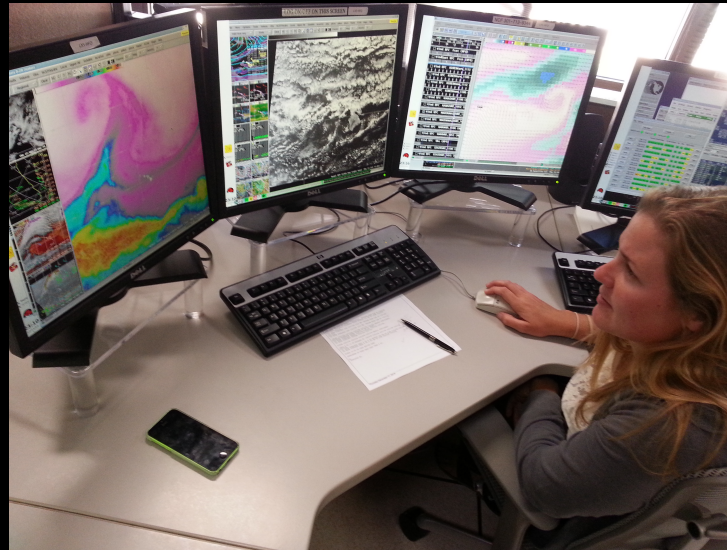
Recommendations

- We must consider the entire forecaster workflow as part of the training experience and technical implementation. Training content and capabilities of technical systems must be aligned.
 - Proving ground demonstrations can sometimes be too narrowly focused on the new and not as much on the existing.
- Success requires reliance on a system of systems. Ensure the avenues are in place to work across organizational and technical boundaries.



Satellite Proving Ground

The end goal of the satellite proving ground is to provide the means to achieve widespread operational readiness through early exposure to prospective capabilities, imagery, and products.



Questions? Comments?

Jordan Gerth

Jordan.Gerth@noaa.gov



A Presentation

